Description

The invention concerns an engine-generator arrangement comprising an internal combustion engine whose output shaft is connected to the drive shaft of the generator by way of an elastic coupling.

Engine-generator arrangements of that kind are used for example as modules for block heating and generating plants. The elastic coupling makes it possible to achieve rotational elasticity to compensate for shock torque loadings and damping of rotational oscillations as well as radial elasticity to compensate for shaft misalignments.

The state of the art includes a structure as is shown in Figure 1. The output shaft 2 of the internal combustion engine 1 is connected by way of an elastic coupling to the drive shaft 4 of the generator 5. The engine casing 6 of the internal combustion engine 1 is rigidly connected by way of connecting members 7 to the generator casing 8 of the generator 5. The entire engine-generator arrangement is elastically supported on the ground 9. That design configuration does not require accurate orientation of the internal combustion engine 1 with respect to the generator 5. A disadvantage with this structure however is the transmission of vibration by way of the rigid intermediate members, which can adversely affect and ultimately ruin the generator 5.

For that reason, the attempt has already been made in the state of the art to omit those rigid couplings, as is shown by the alternative structures in Figures 2 and 3 relating to the state of the art. In the case of the structure shown in Figure 2 the internal combustion engine 1 and the generator 5 are fixed on a foundation 10 which in turn rests elastically on the ground 9.

A similar structure is shown in Figure 3 in which the internal combustion engine 1 and the generator 5 are fixed on a common stiff frame 11 which rests elastically on the ground 9.

A disadvantage with the structures shown in Figures 2 and 3 is the fact that such foundations or rigid frames for carrying the torque forces are structurally more complicated and expensive.

Therefore the object of the present invention is to provide an improved engine-generator arrangement which avoids the disadvantages of the state of the art.

In accordance with the invention that is achieved in that the engine casing of the internal combustion engine is connected elastically and preferably rubber-

elastically to the generator casing of the generator. The required moments can be reliably transmitted between the engine casing and the generator casing by way of such a preferably rubber-elastic or resilient connection between the engine casing and the generator casing, but at the same time it is also possible to provide for vibration decoupling between the internal combustion engine and the generator, whereby the generator remains protected from engine vibrations. In addition, by virtue of such a coupling which for example is in the form of a rubber-elastic, flexible intermediate layer, it is possible to avoid expensive common torque-transmitting frames or foundations.

An embodiment which is preferred from the structural point of view provides that mounted to the engine casing is a first annular flange which is arranged substantially around the output shaft, that mounted to the generator casing is a second annular flange which is arranged substantially around the drive shaft, and that the two annular flanges are connected together by way of at least one elastic intermediate member, wherein the elastic intermediate member desirably has a rubber-elastic elastomer layer.

The vibration decoupling effect between the internal combustion engine and the generator can however in principle be effected structurally in many different ways, preferably between elastomer elements, so that the vibrations from the engine are not passed to the generator. Design configurations as are already known per se in relation to elastic shaft couplings (pin couplings, dog couplings, bead or flange couplings, intermediate ring couplings, etc) are basically suitable.

The invention is described in greater detail with reference to the description hereinafter of the drawings.

Figures 1 to 3 which have already been described show engine-generator arrangements in accordance with the state of the art,

Figure 4 shows an embodiment of an engine arrangement according to the invention, and

Figure 5 shows a detail of the elastic coupling between the engine casing and the generator casing.

In the embodiment according to the invention as shown in Figure 4, the internal combustion engine 1 drives by way of an output shaft 2 the drive shaft 4 of a generator 5. Both the internal combustion engine 1 and also the generator 5 are supported on the ground 9 by way of simple rubber-mounted supports 12. A

rotationally and radially elastic coupling connects the output shaft 2 to the drive shaft 4.

Now, in accordance with the invention, it is provided that the engine casing 6 is connected elastically and preferably resiliently or rubber-elastically to the generator casing 8.

For that purpose, in the embodiment shown in Figure 4, arranged on the engine casing 6 substantially around the output shaft 2 is a first annular flange 13. A second annular flange 14 is arranged around the generator casing 8, substantially around the drive shaft 4. Now, in accordance with the invention, the two annular flanges 13 and 14 are connected together rubber-elastically and with vibration decoupling, by way of an elastic intermediate member 15.

Figure 5 shows in detail that elastic flexible coupling by means of a rubber-elastic elastomer layer 15.

The elastomer layer 15 is mounted on a steel core 16 and surrounded by a sleeve 17. The flange 13 of the engine casing 6 and the flange 14 of the generator casing 8 are connected by way of the screw 18 with nut 19, wherein in accordance with the invention the screw 18 is elastically supported in the elastomer layer 15. Overall a plurality of such elastically supported screws are distributed around the periphery of the flanges 13 and 14.

It will be appreciated that the invention is not limited to the illustrated embodiments. There are numerous structural options of implementing the elastic coupling according to the invention between the engine casing and the generator casing. The essential consideration in that respect is that this connection on the one hand must be capable of transmitting the required torques and in so doing preferably keeping any shaft angle displacement at a minimum, while on the other hand, preferably using elastomeric materials, it is such that it does not transmit vibration from the internal combustion engine to the generator or transmits such vibration only in a severely damped manner, thereby protecting the generator from vibration-induced damage. In this arrangement, it is possible to avoid a complicated and expensive foundation or frame structure, as is provided in the state of the art shown in Figures 2 and 3.